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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/089,109

03/26/2002

Manabu Suhara

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02/24/2003

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EXAMINER

CANTELMO, GREGG

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 02/24/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/089,109

Applicant(s)

SUHARA ET AL.

Examiner

Gregg Cantelmo

Art Unit

1745

SM
#6

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 3 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 4-11 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☒ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3, 5.
- 4) ☒ Interview Summary (PTO-413) Paper No(s). 5.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Election/Restrictions

1. This application contains claims directed to more than one species of the generic invention. These species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept under PCT Rule 13.1.

The species are as follows:

- a. A lithium cobalt oxide composition of $\text{LiCo}_{1-x}\text{M}_x\text{O}_2$ wherein $x=0$;
- b. A lithium cobalt oxide composition of $\text{LiCo}_{1-x}\text{M}_x\text{O}_2$ wherein $0 < x \leq 0.02$.

Applicant is required, in reply to this action, to elect a single species to which the claims shall be restricted if no generic claim is finally held to be allowable. The reply must also identify the claims readable on the elected species, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered non-responsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

The following claim(s) are generic: none.

2. The species listed above do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, the species lack the same or corresponding special technical features for the following reasons:.

The first species lacks the special technical feature of an additive element M_x wherein $0 < x < 0.02$ as required in the second species.

3. During a telephone conversation with Mr. Stefan U. Koschmieder on February 5, 2002 a provisional election was made with traverse to prosecute the invention of Species II, claims 1-2 and 4-10. Affirmation of this election must be made by applicant in replying to this Office action. Claim 3 is withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Response to Preliminary Amendment

5. The preliminary amendment received March 26, 2002 has been entered.

Priority

6. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

7. The information disclosure statement filed March 26, 2002 has been placed in the application file and the information referred to therein has been considered as to the merits.
8. Applicant is invited to submit certified translations of the X reference citations note on the International Preliminary Examination Form (Form PCT/IPEA/409) for a complete consideration of these references.
9. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

For example, see page 2 of the specification wherein JP-A 10-312805 is disclosed but not cited on an IDS.

Drawings

10. No drawings appear to have been filed in the instant application.

Specification

11. The abstract of the disclosure is objected to because it is not in the form of a single paragraph. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

14. Claim 9 recites the limitation "the current collector" in line 2. There is insufficient antecedent basis for this limitation in the claim. Claim 9 is dependent upon claims 1 and 7, neither of which provide antecedent basis for a current collector. Note that claim 9 may be more appropriately dependent upon claim 8 which would provide proper antecedent basis for this limitation.

Claim Rejections - 35 USC § 102/103

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 1, 2 and 5-11 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over JP 10-001316 A (JP '316).

JP '316 discloses a lithium cobalt composite oxide for a lithium secondary cell (abstract), which is represented by the formula $\text{LiCo}_{1-x}\text{M}_x\text{O}_2$ wherein $0 < x < 0.25$ and M is Ti, Hf, Ta, Nb or Zr (see translation of claim 1 and paragraph [0013]). Since the prior art product has the same elemental and stoichiometric composition as that of the instant claims, there is a reasonable expectation that the composite oxide in JP '316 will have the same properties as recited in instant claim 1.

As discussed above, $0 < x < 0.25$ which encompasses the range of instant claim 2 (also see paragraph [0013]). Since the prior art product has the same the same elemental and stoichiometric composition as that of the instant claims, there is a reasonable expectation that the composite oxide in JP '316 will have the same properties as recited in instant claim 2.

The composition is employed as an active material in a positive electrode for a lithium secondary cell (paragraph [0040] as applied to claim 7).

The mixture comprises the active material above, an electrically conductive material and a binder supported on a current collector. The stainless steel support is the current collector (paragraph [0067] as applied to claim 8).

The stainless steel support is the current collector (paragraph [0067] as applied to claim 9).

A lithium secondary cell employs a positive electrode containing the lithium-cobalt composite oxide for a lithium secondary cell as defined in claim 1 above (paragraph [0040] as applied to claim 10).

Wherein the electrolyte solvent is a propylene carbonate, a cyclic carbonic ester (paragraph [0067] as applied to claim 11).

With respect to the properties of the composition as recited in claims 1 and 2:

Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection. "There is nothing inconsistent in concurrent rejections for obviousness under 35 U.S.C. 103 and for anticipation under 35 U.S.C. 102." In *re Best*, 562 F.2d 1252, 1255 n.4, 195 USPQ 430, 433 n.4 (CCPA 1977). This same rationale should also apply to product, apparatus, and process claims claimed in terms of function, property or characteristic. Therefore, a 35 U.S.C. 102/103 rejection is appropriate for these types of claims as well as for composition claims.

"[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to

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product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

"Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). See MPEP § 2112.

With respect to the process limitations of claims 5 and 6:

Claims 5 and 6 are drawn to process limitations for fabrication of the product of claim 1. The various constituents therein have particular particle size and specific surface area and are fired at a temperature of 850 to 1,000° C in an oxygen-containing atmosphere (claim 5) for a period from 4-30 hours.

These intermediate constituents while having particular average particle size and specific surface area is not clearly and linearly applicable to the end product of claim 1. The product itself claims no particular particle size or specific surface area and the process steps of claims 5 and 6 manipulate the mixture of constituents of claim 5 to

form the end product of claim 1. Thus while the intermediate constituents may have particular dimensions it is not held that these dimensions are linearly applicable to the end product.

Regarding the overall process of claims 5 and 6, the prior art fabricates the same product, as discussed above. The instant application has not established that the prior art product does not anticipate or obviate the product of claim 1. Since it is the Examiner's position, based on the prior art teachings above, that the prior art product anticipates or is obvious over the product of claim 1, and there is no evidence that the process of claims 5 and 6 are critical in obtaining the product of the instant claims, the prior art is held to anticipate or render obvious the product by process limitations of claims 5 and 6.

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

"The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the

prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989).

"[T]he lack of physical description in a product-by-process claim makes determination of the patentability of the claim more difficult, since in spite of the fact that the claim may recite only process limitations, it is the patentability of the product claimed and not of the recited process steps which must be established. We are therefore of the opinion that when the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section 102 or section 103 of the statute is eminently fair and acceptable. As a practical matter, the Patent Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith." In re Brown, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

See MPEP section 2113.

Claim Rejections - 35 USC § 103

18. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP '316 in view of U.S. patent No. 5,709,969 (Yamihira).

The teachings of claim 1, with respect to JP '316, have been discussed above and are incorporated herein. The International Search Report PCT/ISA/210 and the

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International Preliminary Examination Report PCT/ISA/409 both appear to indicate that claim 4 lacks novelty, and would therefore appear to be anticipated by this reference. However there is no explicit disclosure of the packing density of this product and packing density can vary in a given composition due to the pressing of the mixture and therefore is not held to be taught by JP '316.

The difference between claim 4 and JP '316 is that JP '316 does not disclose of the positive electrode having a packing density from 2.90- 3.35 g/cm³.

If the characteristics of the positive electrode are taken into account, the volumetric density of the sintered mass is preferably 2.0 to 4.3 g/ml. If the volumetric density is lower than this range, the energy density cannot be improved sufficiently. Conversely, if the volumetric density of the sintered mass surpasses this range, the electrolyte solution is lowered in impregnating characteristics and in the charging/discharging characteristics. Thus it is preferred to set the pressure for compression molding so that the volumetric density of the sintered mass will be in a range of from 2.0 to 4.3 g/ml and desirably in a range of from 2.5 to 4.0 g/ml (paragraph bridging columns 3 and 4).

In an example LiCoO₂ has a packing density of 3.1 g/ml (3.1 g/cm³ col. 6, ll. 61-63). This specific example is a data point within the instant claim range. Furthermore the range of Yamihira 2.0-4.3 g/ml encompasses the range of 2.90-3.35 g/cm³. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919, F.2d 1575, 16 USPQ 2d 1934 (Fed. Cir. 1990).

The motivation for providing a density within a range of 2.5 to 4.0 g/ml such as 3.1 g/ml is to optimize the energy density of the electrode, the electrolyte solution impregnation characteristics of the electrode and the charging and discharging characteristics of the electrode and cell.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of JP '316 by providing a packing density in the range of 2.90-3.35 g/cm³ since it would have optimized the energy density of the electrode, the electrolyte solution impregnation characteristics of the electrode and the charging and discharging characteristics of the electrode and cell. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesche , 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

Claim Rejections - 35 USC § 102/103

19. Claims 1, 2, 5-7, 10 and 11 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. patent No. 5,147,738 (Toyoguchi).

Toyoguchi discloses a hexagonal (col. 2, ll. 1-8) lithium cobalt composite oxide for a lithium secondary cell (abstract), which is represented by the formula $\text{LiCo}_{1-x}\text{M}_x\text{O}_2$ wherein $x = 0.02$ and M is Ti (see Table 4 wherein $Y = 0.02$ and $x = 1.0$). Since the prior art

product has the same lattice structure and the same elemental and stoichiometric composition as that of the instant claims, there is a reasonable expectation that the composite oxide in Table 4 will have the same properties as recited in claim 1.

As discussed above, $x=0.02$. Since the prior art product has the same lattice structure and the same elemental and stoichiometric composition as that of the instant claims, there is a reasonable expectation that the composite oxide in Table 4 will have the same properties as recited in claim 2.

The composition is employed as an active material in a positive electrode for a lithium secondary cell (abstract as applied to claim 7).

A lithium secondary cell employs a positive electrode containing the lithium-cobalt composite oxide for a lithium secondary cell as defined in claim 1 above (abstract as applied to claim 10).

Wherein the electrolyte solvent is a cyclic or chain carbonic ester (col. 3, ll. 11-15 as applied to claim 11).

With respect to the properties of the composition as recited in claims 1 and 2:

Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection. "There is nothing inconsistent in concurrent rejections for obviousness under 35 U.S.C. 103 and for anticipation under 35 U.S.C. 102." In re Best, 562 F.2d 1252, 1255 n.4, 195

USPQ 430, 433 n.4 (CCPA 1977). This same rationale should also apply to product, apparatus, and process claims claimed in terms of function, property or characteristic. Therefore, a 35 U.S.C. 102/103 rejection is appropriate for these types of claims as well as for composition claims.

"[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

"Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). See MPEP § 2112.

With respect to the process limitations of claims 5 and 6:

Claims 5 and 6 are drawn to process limitations for fabrication of the product of claim 1. The various constituents therein have particular particle size and specific surface area and are fired at a temperature of 850 to 1,000° C in an oxygen-containing atmosphere (claim 5) for a period from 4-30 hours.

These intermediate constituents while having particular average particle size and specific surface area is not clearly and linearly applicable to the end product of claim 1. The product itself claims no particular particle size or specific surface area and the process steps of claims 5 and 6 manipulate the mixture of constituents of claim 5 to form the end product of claim 1. Thus while the intermediate constituents may have particular dimensions it is not held that these dimensions are linearly applicable to the end product.

Regarding the overall process of claims 5 and 6, the prior art fabricates the same product, as discussed above. The instant application has not established that the prior art product does not anticipate or obviate the product of claim 1. Since it is the Examiner's position, based on the prior art teachings above, that the prior art product anticipates or is obvious over the product of claim 1, and there is no evidence that the process of claims 5 and 6 are critical in obtaining the product of the instant claims, the prior art is held to anticipate or render obvious the product by process limitations of claims 5 and 6.

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of

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a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

"The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989).

"[T]he lack of physical description in a product-by-process claim makes determination of the patentability of the claim more difficult, since in spite of the fact that the claim may recite only process limitations, it is the patentability of the product claimed and not of the recited process steps which must be established. We are therefore of the opinion that when the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section 102 or section 103 of the statute is eminently fair and acceptable. As a practical matter, the Patent Office is not equipped to manufacture products by the myriad of processes put before it and then

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obtain prior art products and make physical comparisons therewith." In re Brown, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

See MPEP section 2113.

Claim Rejections - 35 USC § 103

20. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoguchi in view of U.S. patent No. 5,709,969 (Yamihira).

The teachings of claim 1, with respect to Toyoguchi, have been discussed above and are incorporated herein.

The difference between claim 4 and Toyoguchi is that Toyoguchi does not disclose of the positive electrode having a packing density from 2.90- 3.35 g/cm³.

If the characteristics of the positive electrode are taken into account, the volumetric density of the sintered mass is preferably 2.0 to 4.3 g/ml. If the volumetric density is lower than this range, the energy density cannot be improved sufficiently. Conversely, if the volumetric density of the sintered mass surpasses this range, the electrolyte solution is lowered in impregnating characteristics and in the charging/discharging characteristics. Thus it is preferred to set the pressure for compression molding so that the volumetric density of the sintered mass will be in a range of from 2.0 to 4.3 g/ml and desirably in a range of from 2.5 to 4.0 g/ml (paragraph bridging columns 3 and 4).

In an example LiCoO₂ has a packing density of 3.1 g/ml (3.1 g/cm³ col. 6, ll. 61-63). This specific example is a data point within the instant claim range. Furthermore

the range of Yamihira 2.0-4.3 g/ml encompasses the range of 2.90-3.35 g/cm³. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919, F.2d 1575, 16 USPQ 2d 1934 (Fed. Cir. 1990).

The motivation for providing a density within a range of 2.5 to 4.0 g/ml such as 3.1 g/ml is to optimize the energy density of the electrode, the electrolyte solution impregnation characteristics of the electrode and the charging and discharging characteristics of the electrode and cell.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Toyoguchi by providing a packing density in the range of 2.90-3.35 g/cm³ since it would have optimized the energy density of the electrode, the electrolyte solution impregnation characteristics of the electrode and the charging and discharging characteristics of the electrode and cell. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesche , 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

21. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoguchi in view of U.S. patent No. 5,702,843 (Mitate).

The teachings of claims 1 and 7, with respect to Toyoguchi, have been discussed above and are incorporated herein.

The differences between claims 8 and 9 and Toyoguchi are that Toyoguchi does not disclose of a current collector provided to support the cathode mixture (claim 8) or the current collector being aluminum or stainless steel (claim 9).

With respect to claim 8:

Toyoguchi discloses of the positive electrode material is a mixture of the active material, an electrically conductive material (acetylene black) and a binder resin (paragraph bridging columns 2 and 3).

A current collector may be used to facilitate the transfer of electrons to/from the electrode. A material for the collector is not particularly limited, but the collector may be formed of a mono-element metal, an alloy, a carbon material or the like. Examples of specific materials for the collector include titanium, iron, nickel, copper, aluminum, stainless steel, and copper, aluminum and stainless steel materials coated with carbon, nickel, titanium, silver or the like, and those materials surface-treated for oxidation (Mitate, col. 4, ll. 45-59).

The motivation for providing a current collector is that it facilitates electron transfer to and from the electrode.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Toyoguchi by providing a current collector since it would have facilitated electron transfer to and from the electrode.

With respect to claim 9:

A material for the collector is not particularly limited, but the collector may be formed of a mono-element metal, an alloy, a carbon material or the like. Examples of specific materials for the collector include titanium, iron, nickel, copper, aluminum, stainless steel, and copper, aluminum and stainless steel materials coated with carbon, nickel, titanium, silver or the like, and those materials surface-treated for oxidation (Mitate, col. 4, ll. 45-59). The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

The motivation for selecting the current collector to be stainless steel or aluminum that it would have provided a cathode support which has good electrical conductivity but does not undergo chemical change in the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Toyoguchi by selecting the current collector to be stainless steel or aluminum since it would have provided a cathode support which has good electrical conductivity but does not undergo chemical change in the battery.

Claim Rejections - 35 USC § 102/103

22. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

23. Claims 1, 2, 5-7, 10 and 11 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. patent No. 6,395,426 (Imachi).

Imachi discloses a lithium cobalt composite oxide for a lithium secondary cell (abstract), which is represented by the formula $\text{LiCo}_{1-x}\text{M}_x\text{O}_2$ (col. 7, line 48) wherein $0.00001 < x < 0.02$ (col. 3, ll. 1-4) and M is Ti. Since the prior art product has the same elemental and stoichiometric composition as that of the instant claims, there is a reasonable expectation that the composite oxide of Imachi will have the same properties as recited in claim 1.

As discussed above, $0.00001 < x < 0.02$. Since the prior art product has the same lattice structure and the same elemental and stoichiometric composition as that of the instant claims, there is a reasonable expectation that the composite oxide of Imachi will have the same properties as recited in claim 2.

The composition is employed as an active material in a positive electrode for a lithium secondary cell (abstract as applied to claim 7).

A lithium secondary cell employs a positive electrode containing the lithium-cobalt composite oxide for a lithium secondary cell as defined in claim 1 above (abstract as applied to claim 10).

Wherein the electrolyte solvent is a cyclic or chain carbonic ester (col. 3, ll. 28-42 and 8, ll. 13-21 as applied to claim 11).

With respect to the properties of the composition as recited in claims 1 and 2:

Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection. "There is nothing inconsistent in concurrent rejections for obviousness under 35 U.S.C. 103 and for anticipation under 35 U.S.C. 102." In re Best, 562 F.2d 1252, 1255 n.4, 195 USPQ 430, 433 n.4 (CCPA 1977). This same rationale should also apply to product, apparatus, and process claims claimed in terms of function, property or characteristic. Therefore, a 35 U.S.C. 102/103 rejection is appropriate for these types of claims as well as for composition claims.

"[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to

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product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

"Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). See MPEP § 2112.

With respect to the process limitations of claims 5 and 6:

Claims 5 and 6 are drawn to process limitations for fabrication of the product of claim 1. The various constituents therein have particular particle size and specific surface area and are fired at a temperature of 850 to 1,000° C in an oxygen-containing atmosphere (claim 5) for a period from 4-30 hours.

These intermediate constituents while having particular average particle size and specific surface area is not clearly and linearly applicable to the end product of claim 1. The product itself claims no particular particle size or specific surface area and the process steps of claims 5 and 6 manipulate the mixture of constituents of claim 5 to

form the end product of claim 1. Thus while the intermediate constituents may have particular dimensions it is not held that these dimensions are linearly applicable to the end product.

Regarding the overall process of claims 5 and 6, the prior art fabricates the same product, as discussed above. The instant application has not established that the prior art product does not anticipate or obviate the product of claim 1. Since it is the Examiner's position, based on the prior art teachings above, that the prior art product anticipates or is obvious over the product of claim 1, and there is no evidence that the process of claims 5 and 6 are critical in obtaining the product of the instant claims, the prior art is held to anticipate or render obvious the product by process limitations of claims 5 and 6.

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

"The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the

prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989).

"[T]he lack of physical description in a product-by-process claim makes determination of the patentability of the claim more difficult, since in spite of the fact that the claim may recite only process limitations, it is the patentability of the product claimed and not of the recited process steps which must be established. We are therefore of the opinion that when the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section 102 or section 103 of the statute is eminently fair and acceptable. As a practical matter, the Patent Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith." In re Brown, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

See MPEP section 2113.

Claim Rejections - 35 USC § 103

24. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Imachi in view of U.S. patent No. 5,709,969 (Yamihira).

The teachings of claim 1, with respect to Imachi, have been discussed above and are incorporated herein.

The difference between claim 4 and Imachi is that Imachi does not disclose of the positive electrode having a packing density from 2.90- 3.35 g/cm³.

If the characteristics of the positive electrode are taken into account, the volumetric density of the sintered mass is preferably 2.0 to 4.3 g/ml. If the volumetric density is lower than this range, the energy density cannot be improved sufficiently. Conversely, if the volumetric density of the sintered mass surpasses this range, the electrolyte solution is lowered in impregnating characteristics and in the charging/discharging characteristics. Thus it is preferred to set the pressure for compression molding so that the volumetric density of the sintered mass will be in a range of from 2.0 to 4.3 g/ml and desirably in a range of from 2.5 to 4.0 g/ml (paragraph bridging columns 3 and 4).

In an example LiCoO₂ has a packing density of 3.1 g/ml (3.1 g/cm³ col. 6, ll. 61-63). This specific example is a data point within the instant claim range. Furthermore the range of Yamihira 2.0-4.3 g/ml encompasses the range of 2.90-3.35 g/cm³. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. In re Wertheim, 541 F.2d 257, 191 USPQ 90 (CCPA 1976); In re Woodruff, 919, F.2d 1575, 16 USPQ 2d 1934 (Fed. Cir. 1990).

The motivation for providing a density within a range of 2.5 to 4.0 g/ml such as 3.1 g/ml is to optimize the energy density of the electrode, the electrolyte solution impregnation characteristics of the electrode and the charging and discharging characteristics of the electrode and cell.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Imachi by providing a packing density in the range of 2.90-3.35 g/cm³ since it would have optimized the energy density of the electrode, the electrolyte solution impregnation characteristics of the electrode and the charging and discharging characteristics of the electrode and cell. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. In re Boesche , 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). In re Hoeschele, 406 F.2d 1403, 160 USPQ 809 (CCPA 1969).

25. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imachi in view of U.S. patent No. 5,702,843 (Mitate).

The teachings of claims 1 and 7, with respect to Imachi, have been discussed above and are incorporated herein.

The differences between claims 8 and 9 and Imachi are that Imachi does not disclose of a current collector provided to support the cathode mixture (claim 8) or the current collector being aluminum or stainless steel (claim 9).

With respect to claim 8:

Imachi discloses of the positive electrode material is a mixture of the active material, an electrically conductive material and a binder resin (col. 6, ll. 11-18).

A collector may be used to facilitate the transfer of electrons to/from the electrode. A material for the collector is not particularly limited, but the collector may be formed of a mono-element metal, an alloy, a carbon material or the like. Examples of specific materials for the collector include titanium, iron, nickel, copper, aluminum, stainless steel, and copper, aluminum and stainless steel materials coated with carbon, nickel, titanium, silver or the like, and those materials surface-treated for oxidation (Mitate, col. 4, ll. 45-59).

The motivation for providing a current collector is that it facilitates electron transfer to and from the electrode.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Imachi by providing a current collector since it would have facilitated electron transfer to and from the electrode.

With respect to claim 9:

A material for the collector is not particularly limited, but the collector may be formed of a mono-element metal, an alloy, a carbon material or the like. Examples of specific materials for the collector include titanium, iron, nickel, copper, aluminum, stainless steel, and copper, aluminum and stainless steel materials coated with carbon, nickel, titanium, silver or the like, and those materials surface-treated for oxidation (Mitate, col. 4, ll. 45-59). The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in

Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945) See also In re Leshin, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

The motivation for selecting the current collector to be stainless steel or aluminum that it would have provided a cathode support which has good electrical conductivity but does not undergo chemical change in the battery.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of Imachi by selecting the current collector to be stainless steel or aluminum since it would have provided a cathode support which has good electrical conductivity but does not undergo chemical change in the battery.

Claim Rejections - 35 USC § 102/103

26. Claims 1, 2 and 4-11 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over U.S. patent application publication No. 2002/0081495 A (Nakajima).

Nakajima discloses a lithium cobalt composite oxide for a lithium secondary cell (abstract), which is represented by the formula $\text{LiCo}_{1-x}\text{M}_x\text{O}_2$ wherein $0.003 < x < 0.015$ and M is Ti (see paragraph [0008]). Since the prior art product has the same elemental and stoichiometric composition as that of the instant claims, there is a reasonable expectation that the composite oxide of Nakajima will have the same properties as recited in claim 1.

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Further, $0.006 < x < 0.012$ (paragraph [0010]). Since the prior art product has the same lattice structure and the same elemental and stoichiometric composition as that of the instant claims, there is a reasonable expectation that the composite oxide of Nakajima will have the same properties as recited in claim 2.

The packing density is from 2.6 g/cm³ to 3.1 g/cm³ (Table 6 and paragraph [0122] as applied to claim 4).

The composition is employed as an active material in a positive electrode for a lithium secondary cell (abstract as applied to claim 7).

The positive electrode material is a mixture of the active material, an electrically conductive material, a binder resin supported on the current collector (paragraphs [0030]- [0032] and [0037] as applied to claim 8).

The holder for the positive electrode active material is stainless steel or aluminum (paragraph [0033] as applied to claim 9).

A lithium secondary cell employs a positive electrode containing the lithium-cobalt composite oxide for a lithium secondary cell as defined in claim 1 above (abstract as applied to claim 10).

Wherein the electrolyte solvent is a cyclic or chain carbonic ester (paragraph [0044] as applied to claim 11).

With respect to the properties of the composition as recited in claims 1 and 2:

Where applicant claims a composition in terms of a function, property or characteristic and the composition of the prior art is the same as that of the claim but

the function is not explicitly disclosed by the reference, the examiner may make a rejection under both 35 U.S.C. 102 and 103, expressed as a 102/103 rejection. "There is nothing inconsistent in concurrent rejections for obviousness under 35 U.S.C. 103 and for anticipation under 35 U.S.C. 102." In re Best, 562 F.2d 1252, 1255 n.4, 195 USPQ 430, 433 n.4 (CCPA 1977). This same rationale should also apply to product, apparatus, and process claims claimed in terms of function, property or characteristic. Therefore, a 35 U.S.C. 102/103 rejection is appropriate for these types of claims as well as for composition claims.

"[T]he PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his [or her] claimed product. Whether the rejection is based on inherency' under 35 U.S.C. 102, on prima facie obviousness' under 35 U.S.C. 103, jointly or alternatively, the burden of proof is the same...[footnote omitted]." The burden of proof is similar to that required with respect to product-by-process claims. In re Fitzgerald, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980) (quoting In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433-34 (CCPA 1977)).

Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

"Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the

prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present. In re Spada, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). See MPEP § 2112.

With respect to the process limitations of claims 5 and 6:

Claims 5 and 6 are drawn to process limitations for fabrication of the product of claim 1. The various constituents therein have particular particle size and specific surface area and are fired at a temperature of 850 to 1,000° C in an oxygen-containing atmosphere (claim 5) for a period from 4-30 hours.

These intermediate constituents while having particular average particle size and specific surface area is not clearly and linearly applicable to the end product of claim 1. The product itself claims no particular particle size or specific surface area and the process steps of claims 5 and 6 manipulate the mixture of constituents of claim 5 to form the end product of claim 1. Thus while the intermediate constituents may have particular dimensions it is not held that these dimensions are linearly applicable to the end product.

Regarding the overall process of claims 5 and 6, the prior art fabricates the same product, as discussed above. The instant application has not established that the prior art product does not anticipate or obviate the product of claim 1. Since it is the Examiner's position, based on the prior art teachings above, that the prior art product anticipates or is obvious over the product of claim 1, and there is no evidence that the process of claims 5 and 6 are critical in obtaining the product of the instant claims, the

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prior art is held to anticipate or render obvious the product by process limitations of claims 5 and 6.

"[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted).

"The Patent Office bears a lesser burden of proof in making out a case of prima facie obviousness for product-by-process claims because of their peculiar nature" than when a product is claimed in the conventional fashion. In re Fessmann, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). Ex parte Gray, 10 USPQ2d 1922 (Bd. Pat. App. & Inter. 1989).

"[T]he lack of physical description in a product-by-process claim makes determination of the patentability of the claim more difficult, since in spite of the fact that the claim may recite only process limitations, it is the patentability of the product claimed and not of the recited process steps which must be established. We are therefore of the opinion that when the prior art discloses a product which reasonably appears to be

either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section 102 or section 103 of the statute is eminently fair and acceptable. As a practical matter, the Patent Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith." In re Brown, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

See MPEP section 2113.

Conclusion

27. Due to the lack of unity as presented above, neither WO 99-049528 nor JP 10-279315 were applied as prior art rejections since they appear to be directed only to the non-elected invention, wherein no additive element M is present.


28. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregg Cantelmo whose telephone number is (703) 305-0635. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan, can be reached on (703) 308-2383. FAX communications should be sent to the appropriate FAX number: (703) 872-9311 for After Final Responses only; (703) 872-9310 for all other responses. FAXES received after 4 p.m. will not be processed until the following business day. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

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Gregg Cantelmo
Patent Examiner
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February 8, 2003